

§ 173.176 Capacitors.

(a) Capacitors, including capacitors containing an electrolyte that does not meet the definition of any hazard class or division as defined in this part, must conform to the following requirements:

(1) Capacitors not installed in equipment must be transported in an uncharged state;

(2) Each capacitor must be protected against a potential short circuit hazard in transport as follows:

(i) When a capacitor's energy storage capacity is less than or equal to 10 Wh or when the energy storage capacity of each capacitor in a module is less than or equal to 10 Wh, the capacitor or module must be protected against short circuit or be fitted with a metal strap connecting the terminals; or

(ii) When the energy storage capacity of a capacitor or a capacitor in a module is more than 10 Wh, the capacitor or module must be fitted with a metal strap connecting the terminals;

(3) Capacitors containing an electrolyte that meets the definition of one or more hazard class or division as defined in this part, must be designed to withstand a 95 kPa (0.95 bar, 14 psi) pressure differential;

(4) Capacitors must be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid that is released upon venting must be contained by the packaging or by the equipment in which a capacitor is installed; and

(5) Capacitors must be marked with the energy storage capacity in Wh.

(b) Capacitors must be packed in strong outer packagings. For transport by air, capacitors must be securely cushioned within the outer packagings. Capacitors installed in equipment may be offered for transport unpackaged or on pallets, when the capacitors are afforded equivalent protection by the equipment in which they are contained.

(c) Capacitors containing an electrolyte not meeting the definition of any hazard class or division as defined in this part, including when installed in equipment, are not subject to any other requirements of this subchapter.

(d) Capacitors containing an electrolyte that meets the definition of one or

more hazard class or division as defined in this part, with an energy storage capacity of 10 Wh or less are not subject to any other requirements of this subchapter, when they are capable of withstanding a 1.2 m (3.9 feet) drop test unpackaged onto a rigid, non-resilient, flat and horizontal surface without loss of contents.

(e) Capacitors containing an electrolyte meeting the definition of one or more hazard class or division as defined in this part, that are not installed in equipment, and with an energy storage capacity of more than 10 Wh are subject to the requirements of this subchapter.

(f) Capacitors installed in equipment and containing an electrolyte meeting the definition of one or more hazard class or division as defined in this part, are not subject to any other requirements of this subchapter, provided the equipment is packaged in a strong outer packaging and in such a manner as to prevent accidental functioning of the capacitors during transport. Large, robust equipment containing capacitors may be offered for transport unpackaged or on pallets when the capacitors are afforded equivalent protection by the equipment in which they are contained.

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§ 173.181 Pyrophoric materials (liquids).

When the §172.101 table specifies that a hazardous material be packaged under this section, only the following non-bulk packagings are authorized:

(a) Specification steel or nickel cylinders prescribed for any compressed gas except acetylene having a minimum design pressure of 1206 kPa (175 psig). Cylinders with valves must be:

(1) Equipped with steel valve protection caps or collars, unless overpacked; or

(2) Overpacked in a wooden box (4C1, 4C2, 4D or 4F); fiberboard box (4G), or plastic box (4H1 or 4H2). Cylinders must be secured to prevent shifting in the box and, when offered for transportation or transported, must be so loaded that pressure relief devices remain in the vapor space of the cylinder. (See §177.838(h) of this subchapter.)